The Kentucky Agricultural Experiment Station and its Work

Edited by Thomson R. Bryant, Supt.

EDITOR'S NOTE—This is the sixth of a series of articles on The Kentucky Agricultural Experiment Station and its Work

Restoration of Fertility to Rundown Lands

By H. B. Hendrick,

Asst. Agronomist, Kentucky Agricultural Experiment Station

The Irvington demonstration field with the run down gullied area and The Webster Stone Company's limestone plant in the distance.

TWO of the photographs shown in this article were taken from adjacent fields. The fields are owned by different farmers and the line fence is all that separates them. In fact, the placings of the camera to get the two views were not fifteen rods apart. One of the photographs shows a field grown up to weeds, broom sedge, wild briers and brushes. The rolling surface of the field is badly washed and gullied, the erosion from water having cut ditches fully three feet deep. The other photograph shows a beautiful field of alfalfa, free from weeds, nearly waist high, capable of producing the first cutting fully two tons of cured hay per acre. The two fields were the same kind of soil and represent the same innate fertility. Thirty years ago their productiveness was the same. The difference, then, is not in the soil but in the farmer. The owner of the one farm has been for years a corn and tobacco grower, keeping comparatively little stock, and growing almost no legume crops. Red clover seed has not been sown upon this farm for twenty years. The owner of the other farm grows regular rotations of crops, including corn, cowpeas, wheat, clover and alfalfa (no tobacco). This farmer feeds one hundred or more beef cattle every winter and has sixty acres of alfalfa upon his four-hundred-acre farm.

Here we have represented, side by side, the way by which lands are run down, and the means by which they can be kept up, or consistently restored to fertility when they have been run down. The running down of fertility, or depletion of soils, is a slow process, likewise the consistent building-up process, or restoration of fertility, is slow. In this particular case the depletion to a condition of low productiveness, on the one farm, has been in process for thirty or forty years, while on the other farm it has taken a like number of years to build up the soil to a high state of productiveness, which is above the average of the community and is even above the natural fertility.

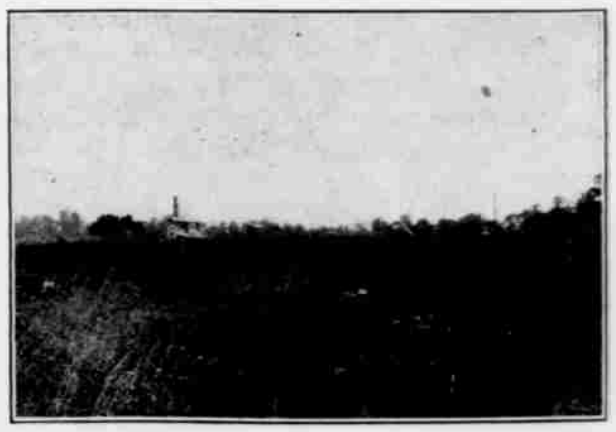
Striking contrasts in farming like the above are of common occurrence in our State. The lamentable feature is that the farm lands being depleted are much in excess of those whose fertility is being maintained and improved or restored. This condition affects all of our people, and its iniquities may be visited upon the third and fourth generations.

The virgin soil of this state was many hundred years in formation. It consists of a mixture of the early rock formations and the decay of vegetable and animal (organic) life which grew thereon. The frost, the water and the wind were the chief agencies in reducing the original rock to the finest particles, which now constitute our various soils. The first plants were a lower series, such as the fungi, the algae, the mosses and the ferns. The decay of these lower series of plants with the broken-down rock particles formed the basis for the growth of the higher series of plants which now constitute the food of all animal life.

Soil, then, is mineral matter plus organic matter, in the process of decay. The mineral plant-food elements of any soil are therefore largely dependent upon the original rock formation of the section. The most important of these elements are phosphorus, potassium and calcium. The last two of these are very abundant in most Kentucky soils. The decaying organic matter (humus) of the soil performs most important functions. Some of these are:

1. It furnishes nitrogen, the most important element of plant growth.
2. It adds greatly to the moisture-holding capacity of the soil.
3. It furnishes materials for bacterial development in the soil.
4. It keeps clay soils friable and porous so that air can circulate freely.
5. It prevents plants from heaving out of the ground in winter.
6. It furnishes mineral plant food elements in best form for plant growth.

There are several potent factors which have depleted our soils. Corn, which is our principal crop, draws heavily upon the plant-food elements of the soil. A 100-bushel corn crop requires 148 pounds of nitrogen, 23 pounds of phosphorus and 71 pounds of potassium for its growth. The nitrogen is all furnished from the humus of the soil. Planting corn or tobacco on the same field for several years in succession without a winter cover crop is very detrimental to the soil. The lands of Kentucky are mostly rolling clay soils. Such lands are easily eroded.



One of the deep gullies in the Irvington demonstration field.